Fig. 2. *Aphrocallistes Bocagei.* Two nodes of the network, with two sex-radiate casts, each with one ray prolonged to form the interior of one of the long spines of the interior of the netted tube (×140).

Fig. 3. Capitate termination of a spicular cast in the fibre of *D. subglobosus* (×435).

Fig. 4. *Farrea densa.* A node of the network, exhibiting casts of three imbedded spicules (×104).

Fig. 5. *Hyalonema Sieboldii.* Cut end of a length of the anchoring spicule, with the lamellar structure revealed by solution (×104).

Figs. 6 to 9. *Geodia arabica.* Globo-stellates in various stages of solution: *h*, hilum; *r*, radiate structure; *c*, central cavity; *s*, contained air-bubble (×140).

Figs. 10 & 11. *Pachymatisma Johnstonia.* Globo-stellates: *p*, hemispherical excavations (×140).

Figs. 12 & 13. *Geodia arabica.* Spines of a globo-stellate separated by solution: fig. 12, seen in elevation; fig. 13, in plan (×435).

Fig. 14. *P. Johnstonia.* Globo-stellate: *f*, thin structureless external film of silica, separated from the rest of the spicule within it (×140).

Fig. 15. Hemispherical excavations on the exterior of an acerate spicule of *Geodia arabica*: *a*, one showing the circular outcrop of the concentric lamellæ round its walls (×140).

Figs. 16 & 17. Ends of cylindrical spicules of *Pachymatisma Johnstonia* (×435).

Fig. 18. Abnormal structure, showing two spicules of *P. Johnstonia* ankylosed together (×140).

Fig. 19. *Trachya*, sp. Acuate spicule: *a*, originally pointed end; *b*, rounded end (×435).

XXXVII.—*Notes on Stony Corals in the Collection of the British Museum.* By Dr. F. Brüggemann.

III. A Revision of the Recent Solitary Mussaceæ.

Of the above-named group, which is equivalent to the *Lithophylliacées simples* of Milne-Edwards and Haime, there appear to exist at least four genera comprising living species. They may be tabulated in the following manner:—

A. Without a distinct epitheca ..... 1. Scolymia.
B. With an epitheca.
  a. Edges of the larger septa roughly lacero-dentate, the outermost teeth the strongest ..... 2. Cynarina.
  b. Edges of the septa equally dentate.
    1. Columella large, spongious ..... 3. Antillia.
    2. Columella small, trabecular..... 4. Homophyllia.

Taking other characters into view, another arrangement can be made:—

A. Coral fixed to the ground, with an expanded base.
  a. Costæ roughly spinose ..... 1. Scolymia.
  b. Costæ denticulate ..... 4. Homophyllia.
B. Coral free in old age, with a pointed or rounded base.
  a. Costæ roughly spinose ..... 2. Cynarina.
  b. Costæ denticulate ..... 3. Antillia.

A third mode of differentiating them is this:—

A. Calicle and columella nearly circular ..... 4. Homophyllia.
B. Calicle more or less circular; columella oblong, with a longer and shorter axis.
  a. Coral cylindro-turbinate or columniform 1. Scolymia.
  b. Coral turbinate ..... 2. Cynarina.
C. Calicle and columella decidedly bilateral, both of them with a longer and shorter axis ..... 3. Antillia.

Most of the genera exhibit more affinities to some of the compound Mussaceæ than to each other; they might also be shortly defined thus:—

1. *Scolymia*, as a solitary *Mussa* without an epitheca.
2. *Cynarina*, as a solitary *Mussa* with a thick epitheca.
3. *Antillia*, as a solitary *Trachyphyllia* with a thick epitheca.
4. *Homophyllia*, as a solitary *Isophyllia* with a delicate epitheca.

I. Scolymia.

Caryophyllia, Milne-Edwards and Haime, Compt. Rend. xxvii. p. 491.
Scolymia, Haime, Mém. Soc. Géol. Fr. (2) iv. p. 279, note.
Lithophyllia, Milne-Edwards and Haime, Hist. Nat. Cor. ii. p. 290.

Coral cylindro-turbinate, cylindrical, or almost prismatical, in all ages attached to the ground by an expanded base, without a distinct epitheca. Costæ prominent, roughly spinose, the uppermost spines being the strongest. Calicle shallow, circular, rarely oblong, rectangular or lobate. Septa of first and second cycles with their free edges lacero-dentate, the teeth increasing in size from within outwards. Columella oblong in outline, consisting of thin trabeculæ, its surface finely papillose or imbricate.

The Lamarckian name *Caryophyllia* having been previously restricted to another genus of stony corals, J. Haime proposed in 1852 to use for the present group the generic appellation of *Scolymia*, a name which Jourdan had applied to it in the Lyons Museum. There were not sufficient reasons to rename the genus subsequently; the name *Scolymia had* been published, whether by Haime or by Jourdan himself is

no matter; and it is dissimilar enough to *Scolymus* (a genus of Mollusca) to prevent confusion. The family will be more appropriately termed *Mussaceæ*, from its principal genus *Mussa*, which is, moreover, of earlier date than either *Scolymia* or *Lithophyllia*.

I cannot concur in Count de Pourtalès's opinion (Deep-Sea Corals, p. 70) that the species of *Lithophyllia* will turn out to be younger stages of other corals—a suggestion already indicated by Esper, who united the *Sc. lacera* with a species of *Mussa*. *Sc. dubia* is indeed dubious in this respect; but as to *Sc. lacera*, *cubensis*, and *lacrymalis*, these are certainly permanent solitary forms. Some other species ought to be excluded from this genus, viz.:—

1. *Lithophyllia radians*, Duchassaing and Michelotti, Mem. Accad. Tor. (2) xxiii. p. 171, pl. vii. figs. 3, 4. According to the description and figure, the coral is much elevate, the septa are moderately dentate; the columella is very small, almost rudimentary. As these characters do not occur in the true *Scolymiæ*, the species in question may perhaps belong to another genus; but it seems to be established on a single specimen only.

2. *Lithophyllia cylindrica*, Duch. & Mich. *op. cit.* xix. p. 344, pl. ix. figs. 17, 18. The magnified figure shows the coral covered with a well-defined epitheca, the septa much exsert, rounded, their edges with small subequal teeth. I am inclined to consider this an early stage of an *Antillia*; it bears a general resemblance to a coral from Borneo which I shall proceed to describe as the young of *Antillia constricta*.

3. *Lithophyllia multilamella*, Duch. & Mich. *op. cit.* xxiii. p. 171, pl. viii. fig. 12. Most probably Pourtalès was correct in pronouncing this the young of an *Isophyllia*. It is, however, not identical with the *Isophyllia multilamella* of Pourtalès (Cat. Mus. Comp. Zool. iv. p. 70); for Duchassaing and Michelotti state, "les lamelles sont éloignées d'un millimètre," while Pourtalès's *Isophyllia* has from thirteen to fifteen septa in the space of a centimetre.

4. *Caryophyllia australis*, M.-Edw. & Haime, Ann. Sc. Nat. (3) xi. p. 239. The French authors have at first, with some hesitation, included this coral in the present genus; afterwards (Polyp. Foss. Terr. Paléoz. p. 87) they refer it to *Isophyllia*. As it differs materially from both these genera, I have made it the type of a new one.

The species of *Scolymia* known to me may be thus characterized:—

A. Costal spines directed upwards; surface of columella spongious; six cycles of septa.
  a. Primary and secondary septa thickened throughout their whole length, with a narrow cavity within; costal spines fistular; calice oblong or rectangular; coral very short ..... 1. *Sc. cubensis.*
  b. Septa of first cycles only thickened towards the wall, solid, as are also the costal spines.
    1. Calicle circular, rarely oblong; the larger septal teeth and the costal spines rather obtuse ..... 2. *Sc. lacera.*
    2. Calicle strongly lobate: the larger septal teeth and the costal spines acutely pointed ..... 3. *Sc. dubia.*

B. Costal spines directed outwards, or even downwards; columella dense, with subimbricate surface.
  a. Five cycles of septa; larger septal and costal teeth spiniform, much pointed ..... 4. *Sc. vitiensis.*
  b. Four cycles of septa; larger septal and costal teeth knob-like, obtuse ..... 5. *Sc. lacrymalis.*

1. *Scolymia cubensis.* B.M.

Caryophyllia cubensis, Milne-Edwards & Haime, Ann. Sc. Nat. (3) Zool. xi. p. 238.
Lithophyllia cubensis, M.-Edw. & Haime, Hist. Nat. Cor. ii. p. 292; Duch. & Mich. Mem. Accad. Tor. (2) xix. p. 343, pl. v. fig. 10.

Hab. Cuba; St. Thomas.

Pourtalès describes his *Lith. cubensis* as having the spines of the younger septa branching, sometimes coalescing and perforated; he unites doubtfully with it *L. argemone* and *L. cylindrica*, both of which are stated to have circular calicles. As these characters are more conspicuous in *Sc. lacera*, I am led to believe that his specimens may belong to the latter.

2. *Scolymia lacera.* B.M.

Madrepora lacera, Pallas, Elench. Zooph. p. 298; Esper, Pflanzenth. i. p. 148 (pt.), Madrep. pl. xxv. fig. 2.
Caryophyllia lacera, M.-Edw. & H. Ann. Sc. Nat. (3) xi. p. 237.
Lithophyllia lacera, M.-Edw. & H. Hist. Nat. Cor. ii. p. 291; Duch. & Mich. Mem. Accad. Tor. (2) xix. p. 343.
Lithophyllia argemone, Duch. & Mich. Mem. Accad. Tor. (2) xix. p. 344, pl. ix. figs. 11, 12, pl. x. fig. 15.
Lithophyllia "cubensis," Pourtalès, Cat. Mus. Comp. Zool. iv. p. 70.

Hab. Curaçao (*Pallas*); St. Thomas (*Duch. & Mich.*); Tortugas (*Pourtalès*); Bermuda (*Pourtalès*).

With this species I have identified the *Lithophyllia argemone*, as the description and figures show no differences from

Sc. lacera, except an inferior size and a less developed columella, characters indicating merely a younger age of the specimens. The authors state that the principal septa are very distinct from each other (?) and from the smaller ones. This peculiarity is indeed expressed in fig. 15 on pl. x.; but it is not represented in fig. 11 on pl. ix.*). In *Sc. lacera* the principal septa are sometimes more, sometimes less, distinct from those of the following orders. The development of the sixth cycle is also variable in this species, as already mentioned by the accurate observer Pallas :—"Lamellæ majores centro contiguæ; at his interjectæ plerumque quinæ (raro plures), longitudine et altitudine sensim minores."

3. *Scolymia dubia.* B.M.

Fungus marinus &c., Seba, Thes. iii. p. 199. no. 2, pl. cviii. fig. 2.
Lithophyllia dubia, Duch. & Mich. Mem. Accad. Tor. (2) xix. p. 344, pl. ix. fig. 15; Pourtalès, Cat. Mus. Comp. Zool. Cambr. iv. p. 70.

Hab. St. Thomas; Gulf-stream, Looe Key (*Pourtalès*).

4. *Scolymia vitiensis.* B.M.

Coral short cylindrical, somewhat enlarged towards the calicle. No distinct epitheca. Costæ not well pronounced, scarcely prominent, armed with strong pointed spines which are directed outwards. Calicle rounded, slightly oblong and irregular, very shallow, the free edges of the septa being only slightly inclined. Septal systems indistinct. Septa most delicately and densely granulate on their surfaces, belonging to five complete cycles; those of the first three orders subequal, thick, their three inner edges with a small number (about five) of large teeth, the innermost and outermost of which are pointed, whereas the one or two intermediate are obtusely rounded at the top. Septa of fourth cycle much thinner, with more numerous, subequal, obtuse teeth, those of the fifth very narrow and short, partly rudimentary, their edges irregularly denticulate. Columella very dense, with subimbricate surface, the trabeculæ being enlarged to horizontal somewhat crimpled lamellulæ. Endothecal dissepiments much developed; exotheca wanting.

Hab. Feejee Islands (*F. M. Rayner*).

The single specimen measures nearly 3 centims. in height, and 4 centims. in its largest diameter; it is broken at the base,

* This figure is evidently meant to represent part of the calicle of fig. 12, although it is quoted by the authors as showing some magnified calicles of *Solenastrea micans*.

so that I cannot give any particulars about its mode of adherence. The costæ are closely covered for the greater part of their length with a thin, rose-coloured, calcareous crust, which seems to be rather a nulliporine growth than a true epitheca.

The species is easy to tell from the following; its affinities are more with the American forms, from all of which it differs in the absence of the sixth cycle, the small number of the larger septal teeth, and the direction of the costal spines.

5. *Scolymia lacrymalis.* B.M.

Caryophyllia lacrymalis, M.-Edw. & Haime, Ann. Sc. Nat. (3) Zool. x. p. 320, pl. 8. fig. 1; *iid. op. cit.* xi. p. 238.
Lithophyllia lacrymalis, M.-Edw. & H. Hist. Nat. Cor. ii. p. 292.

Hab. Philippine Islands (*M.-Edw. & H.*); Borneo (*Sir E. Belcher*, in B.M.).

In a young specimen (produced by intracalicinal gemmation) there are only three cycles of septa; the columella is low and consists of a few coarse trabeculæ.

II. Cynarina*.

Agreeing in all respects with *Scolymia*, except that the coral is free when adult, turbinate, and covered with a thick epitheca. From *Antillia* it differs in having the costæ roughly spinose; the free edges of the larger septa lacero-dentate, the septal teeth increasing in size from within outwards, the calicular fossa very shallow; the calice circular in the adult, compressed in the young (the reverse being the case in *Antillia*). From *Homophyllia* it is likewise distinguished by the structure of its costæ, septa, and fossa; besides, *Homophyllia* is always fixed by its base, and shows a very thin, appressed epitheca, whereas the latter is thick and only loosely adherent in *Cynarina*.

I am acquainted with only one species referable to this genus.

Cynarina Savignyi. B.M.

Coral turbinate, somewhat ventricose, ponderous, free. Outside of wall covered till near the edge with a thick epitheca, through which, however, the costæ and their spines are visible. Costæ unequal, prominent, roughly spinose; scabrous from being covered with minute pointed granules. Calicle circular, extremely shallow; the free edge of the larger septa

* From *Cynara*, a genus of phanerogamous plants, in allusion to *Scolymia*.

is almost horizontal; at their inner extremity they fall off suddenly and nearly perpendicularly to the columella, thus marking a well-defined columellar fossula. Five complete cycles, most regularly developed. Septa strongly projecting, covered all over with scattered pointed granules; those of the first three orders subequal, rather thick, with their free edges irregularly lacero-dentate, a deeper incision being marked half of their length; their teeth few in number (about six), those in the outer half generally closely united to a large projecting lobe. Septa of fourth cycle much thinner, narrower, and a little shorter, their edges with crowded, narrow, and pointed teeth; septa of fifth cycle very thin, about half as long as those of the preceding, their edges minutely dentate. Columella oblong, with even surface, densely spongious, its trabeculæ rather thick, irregularly branched and confluent. Endotheca well developed; exotheca apparently none.

Height 4 centims.; diameter of calicle $3\frac{1}{2}$ centims.

Hab. Red Sea, Gulf of Suez (B.M.; *R. MacAndrew* in B.M.).

Of this species, the Museum contains a considerable series of specimens; yet I have taken the description from a single example, because this is the only one which is fully adult and at the same time beautifully regular in its septal apparatus. In the young specimens, the calicle is oval and deeper, the columella scantily developed, papillose. They are attached by a narrow base to dead shells, nullipores, and the like; but they soon become quite free; and then, *vice versâ*, shells and serpulæ are usually attached and agglutinated to their epitheca. The regular development, as described above, is perhaps almost exceptional; in other (more than half-grown) specimens the calicle is irregular in outline, often strongly compressed. In the latter case the fossa is much deeper, and the edges of the wall are not on the same level, being more elevate at the extremities of the shorter axis. The shape and dentation of the septa is also, of course, much influenced by the general shape of the coral: in the compressed specimens their edges are almost perpendicular instead of being horizontal, and nearly entire, with the exception of the uppermost parts.

I have named this species after the excellent French naturalist J. C. Savigny, because he was the first to discover it; he has also figured it in the 'Description de l'Egypte,' Polypes, pl. 4. fig. 2, 1–3. The young specimen (fig. 2, 3) agrees exactly with some in the museum collection. In fig. 2, 1, part of the epitheca is destroyed, and thus the costæ appear to be bare; the septal teeth are rather too much pointed. Fig. 2, 2 is more exact in this respect.

Savigny's figure was either mistaken or overlooked by subsequent authors. Audouin (Explic. somm. d. Planch. Savign. p. 233) declares it to represent a *Caryophyllia*, perhaps the young of *C. carduus*. Ehrenberg (Corall. Roth. Meer. p. 92) refers to it under his *Caryophyllia lacera*, remarking that he himself had not found this coral in the Red Sea. M.-Edwards and Haime have not mentioned it anywhere*.

III. Antillia.

Antillia, Duncan, Quart. Journ. Geol. Soc. xx. p. 28.

Coral short, turbinate, in the earliest stages fixed to the ground by a short pedicel, afterwards free, pointed at its base. Epitheca well developed, moderately appressed, generally with transverse ringlets of growth. Costæ prominent, equal, denticulate. Calicle more or less oblong, with a longer and a shorter axis. Septa much projecting, rounded at their summits, with their free inner edges uniformly and minutely serrato-dentate; the inner thirds of the larger septa sometimes separated by an emargination as paliform lobes. Columella large, oblong, spongious. Animal with a single row of numerous, small, verruciform tentacles, an even, more or less granulate disk, and a single, oval or linear mouth.

This genus was originally established on some fossil West-Indian corals differing from *Montlivaltia* in the possession of a well-developed columella. It has become necessary to draw up a more precise definition of the genus in order to differentiate it sufficiently from its recent allies. It proves to be widely distributed in the coral seas; there are at least four living species belonging to it.

1. *Antillia Lonsdalei.*

Antillia Lonsdaleia, Duncan, Proc. Zool. Soc. 1876, p. 438, pl. xli. figs. 1, 2.

Hab. Japanese seas, in moderate depth.

Prof. Duncan has referred this coral as a variety to a fossil

* The following is a revised index to the Madreporaria figured by Savigny in 'Description de l'Egypte,' Polypes:—

Pl. 3. fig. 4. *Alveopora dædalea* (Forsk.).

Pl. 4. fig. 1. *Antillia Geoffroyi* (Audouin); fig. 2. *Cynarina Savignyi*; fig. 3. *Stylophora digitata* (Pall.); fig. 4. *Montipora crista galli* (Ehrenb.); fig. 5. *Cyphastræa Savignyi*, M.-Edw. & H.; fig. 6. *Alveopora fenestrata* (Lam.).

Pl. 5. fig. 1. *Siderastræa Savignyana*, M.-Edw. & H.; fig. 2. *Goniopora Savignyi*, Dana; fig. 3. *Astræa Savignyi* (M.-Edw. & H.); fig. 4. *Cœloria arabica* (= *C. labyrinthiformis*, M.-Edw. & H.).

species from St. Domingo (*A. Lonsdaleia*, Duncan, Quart. Journ. Geol. Soc. xx. p. 30, pl. iii. fig. 4), from which iti stated to differ only in its general shape.

2. *Antillia explanata.*

Antillia explanata, Pourtalès, Ill. Cat. Mus. Comp. Zool. Cambr. viii. p. 42, pl. viii. figs. 4–6.

Hab. Barbadoes, in 75 fathoms depth.

3. *Antillia Geoffroyi.* B.M.

Turbinolia Geoffroyi, Audouin, Descr. Egypt. Expl. Planch. p. 233 (ex Savigny, *op. cit.* Polypes, pl. 4. fig. 1); Dana, U.S. Expl. Exped. Zooph. p. 190, note.

Trachyphyllia Geoffroyi, M.-Edw. & Haime, Ann. Sc. Nat. (3) xi. p. 276; *iid.* Hist. Nat. Cor. ii. p. 341; Häckel, Arab. Korall. p. 45, pl. ii. fig. 2.

Hab. Red Sea; Gulf of Suez (*R. MacAndrew* in B.M.).

This coral is exceedingly variable. The calicle is rounded in the youngest specimens, afterwards it becomes either broad explanate (and then the coral is always very short) or compressed, even linear, much more so than in the species of *Flabellum*. The proportion between the shorter and longer axis varies, in middle-sized specimens, from 1 : 2 to 1 : 5. When the calicle is open it is generally irregularly constricted in its sides, and there are indications of paliform lobes, although these are never much pronounced; in the compressed specimens they are, of course, wanting.

The present species has been regarded by the French monographists as the young of a compound coral allied to *Trachyphyllia amarantum*. This is a mistake: the young *Trachyphylliæ*, of which there are several examples in the Museum collection, begin to divide at a very early period, and exhibit the same irregular plications as the adult; they have also no trace of an epitheca. On the contrary, all the numerous specimens of *A. Geoffroyi* before me are quite simple, without any inclination to divide; the animals (preserved in spirit) show constantly a single mouth, however elongate the calicle may be; the epitheca is always present and neatly defined, although less extensive in the young.

Savigny's and Milne-Edwards's specimens were evidently not "very young," but fully adult, and, to judge from their enormous size, probably very aged. The only mode of asexual propagation I have noticed in this species is that by means of intracalicular budding; in one specimen this has repeatedly taken place, and thus three calicles are placed one in the other, not unlike the fossil *Cyathophyllum*.

The *Manicina "areolata"* of Ehrenberg (Abh. Berl. Akad. 1832, i. p. 327), quoted here by M.-Edwards and Haime, is, from the description, quite different, and may be a true *Trachyphyllia.*

4. *Antillia constricta.* B.M.

Coral short, turbinate, straight, with pointed base, apparently free. Calicle much longer than broad, oblongo-elliptical, with the sides in their middle deeply and regularly constricted in the direction of the short axis, giving to the outline nearly the shape of an 8; each of the four corners with a very slight indication of an additional constriction. Epitheca well developed, covering half the height of the wall; the latter rather thin, with scanty but conspicuous exotheca. Costæ subequal, prominent, almost cristiform, their edges with a single series of crowded small and acute teeth. Edge of the calicle not on the same level, much elevate in the constricted middle parts, lowest at the extremities of the longer axis. Fossa deep. Septa most regular, belonging to six complete cycles: primary, secondary, and tertiary ones subequal, thick, well projecting, obtusely rounded on their summits; their lateral surfaces covered with remote granules, which are arranged towards the inner edge in oblique rows running to the marginal teeth; their free inner edges in the upper half straight, with small crowded acute teeth, then suddenly dilated to a large paliform lobe, which is separated by a deep, acute or rectangular emargination, and has its edge entire. Septa of fourth cycle smaller and thinner, with irregularly and coarsely dentate edge, the paliform lobe less pronounced and somewhat toothed; those of fifth and sixth cycles lacerately toothed, without paliform lobes. Columella well developed, linear in outline, with even, more papillose than spongious surface, dense, consisting of thin, filiform, subparallel trabeculæ, most of which are evenly furcate at the top. Height of coral 40 millims., longer axis of calicle 65 millims., shorter axis 45 millims., shortest diameter (in the constricted middle parts) 25 millims.

Hab. Borneo (*Sir E. Belcher*).

The above description is taken from a single specimen; but there is another coral (without indication of locality) in the collection which seems to represent a more advanced stage of growth of the same species: it is higher and heavier; the epitheca ascends to five sixths of the height; the costæ are thicker and more roughly dentate; the four smaller constrictions in the corners of the calicle are very conspicuous. In all other respects it agrees with the type specimen, except that

the calicle is wider and the paliform lobes less pronounced; but these may be individual peculiarities, whereas the beforementioned differences are undoubtedly signs of a more advanced age.

In a young specimen from Borneo, the coral is attached by a narrow base, the calicle is rounded oval, with scarcely a trace of constriction in the middle of its sides; there are only four cycles of septa, which are thin, broad, and much exsert, without paliform lobes.

Lastly, there is in the collection also a specimen in spirit from North Australia (collected by J. B. Jukes; "dredged in 10 fathoms depth") which appears to be specifically identical with the Bornean type.

A. constricta differs from *A. Geoffroyi* and *A. Lonsdalei* in the shape of its calicle, the regular development of the septal cycles, and the strong paliform lobes; from the former, besides, in its strictly symmetrical form, in its narrow costæ, and in the structure of its columella, the latter being in *A. Geoffroyi* truly spongious and consisting of irregularly branched and coalescing lamellar trabeculæ.

IV. Homophyllia.

Coral neatly turbinate, with a narrow, somewhat expanded base. Outside of wall covered almost to the edge with a thin closely adherent epitheca, through which the costæ are distinctly perceptible. Costæ crowded, perfectly equal, prominent, minutely denticulate. Calicle circular, deep. Edges of septa with crowded, narrow, subequal teeth. Columella very small, rounded in outline, coarsely trabecular.

This genus is here established for the reception of the *Caryophyllia australis* of Milne-Edwards and Haime, which the authors had united with the *Scolymiæ*, remarking at the same time that, by its epitheca and small columella, it made an approach to *Thecophyllia* (=*Montlivaltia*). In addition to this, the general shape of the coral, the deepness of its calicle (caused by a scanty development of the endothecal dissepiments), and especially the structure of the costæ and septa will justify its generic separation; otherwise it would be necessary to unite all the simple Mussaceæ into one genus. The differences from *Cynarina* have been given above; from *Antillia* it is distinguished by its circular development throughout, by being attached by means of an expanded base in all ages, by its thin and closely adherent epitheca, by the mode of dentation of its septa, and by its small columella.

Homophyllia australis. Types, B.M.

Caryophyllia australis, M.-Edw. & Haime, Ann. Sc. Nat. (3) Zool. x. p. 320, pl. 8. fig. 2; *iid. op. cit.* xi. p. 239.

In this species the septa are moderately prominent, rather thin, of uniform thickness throughout their whole length, and delicately scabrous from the presence of numerous very small pointed granules. The septal systems are quite distinct. There are six cycles, the last of which is incomplete. The primary and secondary septa are equal; the teeth of their edges are much crowded, middle-sized, narrow, straight, rather obtuse; those in the middle part of the septal edge are, on the average, the longest; they decrease in length towards the circumference and centre of the calicle. The tertiary septa are much like the preceding, only a trifle narrower, with fewer and longer teeth; those of the fourth cycle are similar, but they do not reach the columella. The septa of the fifth and sixth cycles are only half as long as those of the fourth, and scarcely dentate on their edges. The columella is much reduced and low, its surface subpapillose.

Very young specimens (4 to 8 millims. in diameter) are broadly attached and very short cylindrical, almost discoid. The epitheca is present from the beginning.

Height of the adult 20 millims.; diameter of calicle as much as 30 millims.

Hab. Port Lincoln (*J. B. Harvey* in B.M.). The statement "Chinese seas" (*M.-Edw. & H.* 1857) is doubtful, and requires confirmation.

Milne-Edwards and Haime, in their later works, have mistaken this coral for the young of a West-Indian *Isophyllia*; the description of *Isophyllia "australis"* (Hist. Nat. Cor. ii. p. 375) has nothing to do with the species now under consideration. The latter is found growing socially on rocks; and occasionally it happens that two neighbouring specimens touching each other become intimately united by their walls. Such is the case in one of the type specimens; and it is most likely that from the observation of this spurious compoundness (which is only caused by contact, not by fissiparity) Milne-Edwards and Haime arrived at their erroneous conclusion. There can be no doubt that *Homophyllia* remains solitary at all ages. The young *Isophylliæ*, moreover, are quite different: they are expanded, convex, with flat under surface and lamelliform costæ; they divide in a curious manner, according to the septal systems. E. de Pourtalès first noticed this kind of development in his *I. guadulpensis*

(Cat. Mus. Comp. Zool. iv. p. 71); but it seems to occur also in a more or less regular way in all the other species.

From this peculiar mode of growth, as well as from the dentation of the septa, the loosely trabecular spreading columella, the general shape and aspect of the corallum, &c., the West-Indian *Isophylliæ* appear to me, by the way, to be a natural generic group which should not be blended with *Symphyllia*, as has been proposed by Pourtalès. *Symphyllia*, in its turn, cannot be separated from *Mussa*; there are, as Verrill (in Dana, Cor. & Cor. Isl., App. p. 336) has already observed, such numerous transitions, not only as regards the species, but also the individual coralla, and even parts of individuals, that, although admitting the justice of Lütken's contrary remarks (Zool. Rec. for 1872), I can see no possibility of keeping these two genera apart. As to the West-Indian so-called *Symphylliæ*, I agree with De Pourtalès that *these* should stand in the same genus with *Isophyllia*. Duchassaing and Michelotti have described as *Symphyllia* not only species of true *Isophyllia*, but also of *Ulophyllia* (which genus is certainly of West-Indian origin) and possibly of *Mycetophyllia*. The differences between all these genera are, indeed, precarious enough. The innermost septal teeth in *Isophyllia* are frequently prolonged to join the trabeculæ of the columella; I would therefore prefer to return to Milne-Edwards and Haime's former classification, and to withdraw again *Isophyllia* in favour of *Ulophyllia* (the latter being prior in date). Perhaps also *Mycetophyllia* cannot be maintained. I am not acquainted with its type species; but there is a West-Indian coral in the Museum collection showing the septal dentation of *Ulophyllia crispa* and the superficial calicles of *Mycetophyllia*; besides, the development of the endotheca is said to be very different in degree in the two species of *Mycetophyllia*. To *Ulophyllia*, in its former, more extensive sense, the following specific names are referable :—

1. *Meandrina crispa*, Lamarck; *Oulophyllia crispa*, M.-Edw. & H.
2. *Oulophyllia Stokesiana*, M.-Edw. & H.
3. *Oulophyllia? spinosa*, M.-Edw. & H. 1849; *Isophyllia spinosa*, M.-Edw. & H. 1857.
4. *Isophyllia "australis,"* M.-Edw. & H. 1857 (not *Caryophyllia australis*, M.-Edw. & H. 1848 and 1849 !).
5. *Symphyllia guadulpensis*, M.-Edw. & H.
6. *Isophyllia "guadulpensis,"* Pourtalès; *Isophyllia "rigida,"* Verrill, 1864. The strong costæ are not sufficient to identify the *Symphyllia guadulpensis*, as they are equally

well, and perhaps even better, developed in *I. sinuosa*; moreover the dentation of the septa in the original *S. guadulpensis* seems to be different.

7. *Astræa rigida*, Dana; *Prionastræa rigida*, M.-Edw. & H.; *Isophyllia rigida*, Verrill, 1872.
8. *Mussa dipsacea*, Dana; *Symphyllia dipsacea*, M.-Edw. & H.; *Isophyllia dipsacea*, Verrill.
9. *Madrepora sinuosa*, Ell. & Sol.; *Isophyllia sinuosa*, Verrill. The original diagnosis given by Ellis and Solander is rather meagre; but as the name has got a precise meaning now by Verrill's good description, it must be accepted for this well-marked species.

10–20. *Symphyllia strigosa*, *S. anemone*, *S. conferta*, *S. Aglae*, *S. helianthus*, *S. Thomasiana*, *S. aspera*, *S. cylindrica*, *S. Knoxi*, *S. marginata*, *S. verrucosa*, Duchassaing & Michelotti, 1860.

21. *Lithophyllia multilamella*, Duch. & Mich. 1864.
22. *Isophyllia* "*multilamella*," Pourtalès*.

For want of sufficient material, I must leave the discrimination of the actual species to future researches. It is more than probable that at least half the number of the above names will prove to be merely synonyms.

XXXVIII.—*On* Bellidia Huntii, *a Genus and Species of Crustacea supposed to be new.* By Philip Henry Gosse, F.R.S.

[Plate X.]

Family **Alpheadæ**.

Bellidia (gen. nov.), Gosse.

Internal antennæ very little above the external: composed of two filaments forming a right angle.

External antennæ with the basal plates very large.

Feet: first pair small, didactyle, consimilar. Second pair long, very slender, didactyle; both arm and wrist many-jointed.

Eyes not covered by the carapace.

Abdomen bent abruptly.

Tail-plates large, all undivided.

* *Mussa fragilis*, Dana, referred to *Isophyllia* by Verrill, is, according to the description, a *Colpophyllia*.